

CLAIMS

1. A mobile communication system that uses an adaptive antenna in a base station and carries out downlink data transmission to a mobile station,
5 said mobile communication system characterized in that

10 said mobile station comprises means for estimating a communication path quality by switching between a downlink common pilot channel transmitted with a first directivity and a downlink dedicated control channel transmitted with a second directivity, and means for notifying an estimation result thereof to said base station, and

15 said base station comprises means for performing a communication control based on said communication path quality.

2. A mobile communication system according to claim 1, characterized in that said mobile station uses, for estimating said communication path quality, said downlink common pilot channel while waiting for data reception and said downlink dedicated control channel while receiving data.

20 3. A mobile communication system according to claim 2, characterized in that said mobile station uses said downlink common pilot channel for estimating said communication path quality after a predetermined time set in advance has elapsed from completion of said data reception.

25 4. A mobile communication system according to any of claims 1 to 3, characterized in that said mobile station uses a value estimated by the use of said downlink dedicated control channel in estimation of said communication path quality until a predetermined time set in advance has elapsed from a last transmission.

5. A mobile communication system according to claim 3 or 4, characterized in that said predetermined time is a time determined depending on a moving speed of said mobile station.

6. A mobile communication system according to claim 2,
characterized in that said mobile station switches from said downlink dedicated
control channel to said downlink common pilot channel when a reception quality
of said downlink common pilot channel changes by a predetermined value or
5 more from a last transmission.

7. A mobile communication system according to claim 2,
characterized in that said mobile station uses a value estimated by the use of
said dedicated control channel in estimation of said communication path quality
when a change in reception quality of said downlink common control channel is a
10 predetermined value or less from a last transmission.

8. A mobile communication system according to any of claims 1 to
7, characterized in that said base station carries out selection of a transmission
mode as said communication control.

9. A mobile communication system according to any of claims 1 to
15 7, characterized in that said base station carries out scheduling as said
communication control.

10. A mobile communication system according to claim 8,
characterized in that the selection of said transmission mode is selection of any
of a modulation system, a coding system, and a spreading rate.

11. A mobile station to which downlink data transmission is carried
out from a base station using an adaptive antenna, said mobile station
characterized by comprising means for estimating a communication path quality
by switching between a downlink common pilot channel transmitted with a first
directivity and a downlink dedicated control channel transmitted with a second
25 directivity.

12. A mobile station according to claim 11, characterized in that said
downlink common pilot channel is used for estimating said communication path
quality while waiting for data reception and said downlink dedicated control

channel is used for estimating said communication path quality while receiving data.

13. A mobile station according to claim 12, characterized in that said downlink common pilot channel is used for estimating said communication path quality after a predetermined time set in advance has elapsed from completion of said data reception.

14. A mobile station according to claim 13, characterized in that a value estimated by said downlink dedicated control channel is used for estimating said communication path quality until the predetermined time set in advance has elapsed from a last transmission.

15. A mobile station according to claim 14, characterized in that said predetermined time is a time determined depending on a moving speed of the subject station.

16. A mobile station according to any of claims 11 to 15, characterized by switching from said downlink dedicated control channel to said downlink common pilot channel when a reception quality of said downlink common pilot channel changes by a predetermined value or more from a last transmission.

17. A mobile station according to any of claims 11 to 16, characterized by using a value estimated by said downlink dedicated control channel for estimating said communication path quality when a change in reception quality of said downlink common control channel is a predetermined value or less from a last transmission.

18. A base station that carries out downlink data transmission to a mobile station by the use of an adaptive antenna, said base station characterized by comprising means for performing a communication control based on a result of estimation of a communication path quality from said mobile station, said estimation carried out by switching between a downlink common pilot channel

transmitted with a first directivity and a downlink dedicated control channel transmitted with a second directivity.

19. A base station according to claim 18, characterized by carrying out selection of a transmission mode as said communication control.

5 20. A base station according to claim 19, characterized in that the selection of said transmission mode is selection of any of a modulation system, a coding system, and a spreading rate.

21. A base station according to claim 18, characterized by carrying out scheduling as said communication control.

10 22. A communication path quality estimation method of a mobile communication system that uses an adaptive antenna in a base station and carries out downlink data transmission to a mobile station, said communication path quality estimation method characterized in that a step of estimating a communication path quality by switching between a downlink common pilot channel transmitted with a first directivity and a downlink dedicated control channel transmitted with a second directivity, and a step of notifying an estimation result thereof to said base station are provided in said mobile station.

15 23. A communication path quality estimation method according to claim 22, characterized in that said downlink common pilot channel is used for estimating said communication path quality while waiting for data reception and said downlink dedicated control channel is used for estimating said communication path quality while receiving data.

20 24. A communication path quality estimation method according to claim 23, characterized in that said downlink common pilot channel is used for estimating said communication path quality after a predetermined time set in advance has elapsed from completion of said data reception.

25 25. A communication path quality estimation method according to claim 22, characterized in that a value estimated by said downlink dedicated

control channel is used for estimating said communication path quality until the predetermined time set in advance has elapsed from a last transmission.

26. A communication path quality estimation method according to claim 24 or 25, characterized in that said predetermined time is a time 5 determined depending on a moving speed of the subject station.

27. A communication path quality estimation method according to claim 22, characterized by switching from said downlink dedicated control channel to said downlink common pilot channel when a reception quality of said downlink common pilot channel changes by a predetermined value or more from 10 a last transmission.

28. A communication path quality estimation method according to claim 22, characterized by using a value estimated by said downlink dedicated control channel for estimating said communication path quality when a change in reception quality of said downlink common control channel is a predetermined 15 value or less from a last transmission.

29. A mobile communication system comprising
a plurality of mobile stations, and
a base station for transmitting data to said plurality of mobile stations,
respectively,

20 wherein each of said mobile stations receives said data, measures a first communication path quality in a data receiving state and a second communication path quality in a data waiting state, and notifies information corresponding to a measurement result thereof to said base station, and said base station controls transmission of said data depending on a notification 25 thereof,

said mobile communication system characterized by comprising
means for performing a transmission control of said data by the use of both said first communication path quality and said second communication path quality.

30. A mobile communication system according to claim 29,
characterized in that said mobile station notifies said base station of information
corresponding to both said first communication path quality and said second
communication path quality, and said base station controls the transmission of
5 said data depending on the notification thereof.

31. A mobile communication system according to claim 30,
characterized in that said mobile station notifies said base station of information
obtained by using said first communication path quality measured in a first
measurement zone being said data receiving state, said second communication
10 path quality measured in a second measurement zone being said data waiting
state, a communication path quality measured in a third measurement zone
being either one of said data receiving state and said data waiting state, and
information indicative of a state of said third measurement zone.

32. A mobile communication system according to claim 30,
15 characterized in that said mobile station notifies said base station of all of said
first communication path quality measured in a first measurement zone being
said data receiving state, said second communication path quality measured in a
second measurement zone being said data waiting state, and a communication
path quality measured in a third measurement zone being either one of said data
20 receiving state and said data waiting state.

33. A mobile communication system according to claim 30,
characterized in that said mobile station notifies said base station of a difference
between said first communication path quality measured in a first measurement
zone being said data receiving state and said second communication path
25 quality measured in a second measurement zone being said data waiting state,
and a communication path quality measured in a third measurement zone being
either one of said data receiving state and said data waiting state.

34. A mobile communication system according to claim 29,

characterized in that said base station uses both said first communication path quality and said second communication path quality for the transmission control of said data.

35. A mobile communication system according to claim 34,
5 characterized in that said base station performs the transmission control of said data by using said first communication path quality measured in a first measurement zone being said data receiving state, said second communication path quality measured in a second measurement zone being said data waiting state, a communication path quality measured in a third measurement zone being either one of said data receiving state and said data waiting state, and
10 information indicative of a state of said third measurement zone.

36. A mobile communication system according to any of claims 29 to 35, characterized in that said mobile station obtains the communication path quality by using a reception signal quality of said data.

15 37. A mobile communication system according to any of claims 29 to 35, characterized in that said base station transmits a pilot signal, and said mobile station obtains the communication path quality by using said pilot signal.

20 38. A mobile communication system according to any of claims 29 to 35, characterized in that said base station transmits said data by using an adaptive antenna.

39. A mobile communication system according to any of claims 1 to 10, characterized in that said communication path quality is used for selecting a communication mode.

25 40. A mobile communication system according to any of claims 29 to 35, characterized in that said communication path quality is used for scheduling.

41. A mobile station included a mobile communication system comprising a plurality of mobile stations, and a base station for transmitting data to said plurality of mobile stations, respectively, wherein each of said mobile

stations receives said data, measures a first communication path quality in a data receiving state and a second communication path quality in a data waiting state, and notifies information corresponding to a measurement result thereof to said base station, and said base station controls transmission of said data
5 depending on a notification thereof,

 said mobile station characterized by comprising means for notifying said base station of information corresponding to both said first communication path quality and said second communication path quality.

42. A mobile station according to claim 41, characterized by notifying
10 said base station of information obtained by using said first communication path quality measured in a first measurement zone being said data receiving state, said second communication path quality measured in a second measurement zone being said data waiting state, a communication path quality measured in a third measurement zone being either one of said data receiving state and said
15 data waiting state, and information indicative of a state of said third measurement zone.

43. A mobile station according to claim 41, characterized by notifying said base station of all of said first communication path quality measured in a first measurement zone being said data receiving state, said second communication path quality measured in a second measurement zone being said data waiting state, and a communication path quality measured in a third measurement zone being either one of said data receiving state and said data waiting state.
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44. A mobile station according to claim 41, characterized by notifying said base station of a difference between said first communication path quality measured in a first measurement zone being said data receiving state and said second communication path quality measured in a second measurement zone being said data waiting state, and a communication path quality measured in a third measurement zone being either one of said data receiving state and said
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data waiting state.

45. A base station included in a mobile communication system comprising a plurality of mobile stations, and a base station for transmitting data to said plurality of mobile stations, respectively, wherein each of said mobile stations receives said data, measures a first communication path quality in a data receiving state and a second communication path quality in a data waiting state, and notifies information corresponding to a measurement result thereof to said base station, and said base station controls transmission of said data depending on a notification thereof,

said base station characterized by comprising means for performing a transmission control of said data by the use of both said first communication path quality and said second communication path quality.

46. A base station according to claim 45, characterized by performing the transmission control of said data by using said first communication path quality measured in a first measurement zone being said data receiving state, said second communication path quality measured in a second measurement zone being said data waiting state, a communication path quality measured in a third measurement zone being either one of said data receiving state and said data waiting state, and information indicative of a state of said third measurement zone.

47. A base station according to claim 46, characterized in that an estimated value of said communication path quality is used for selecting a communication mode.

48. A base station according to claim 46, characterized in that an estimated value of said communication path quality is used for scheduling.

49. A communication path quality estimation method of a mobile communication system comprising a plurality of mobile stations, and a base station for transmitting data to said plurality of mobile stations, respectively,

wherein each of said mobile stations receives said data, measures a first communication path quality in a data receiving state and a second communication path quality in a data waiting state, and notifies information corresponding to a measurement result thereof to said base station, and said base station controls transmission of said data depending on a notification thereof,

said communication path quality estimation method characterized by using both said first communication path quality and said second communication path quality in a transmission control of said data.

50. A communication path quality estimation method according to claim 49, characterized in that said mobile station notifies said base station of information corresponding to both said first communication path quality and said second communication path quality, and said base station controls the transmission of said data depending on the notification thereof.

51. A communication path quality estimation method according to claim 50, characterized by notifying said base station from said mobile station of information obtained by using said first communication path quality measured in a first measurement zone being said data receiving state, said second communication path quality measured in a second measurement zone being said data waiting state, a communication path quality measured in a third measurement zone being either one of said data receiving state and said data waiting state, and information indicative of a state of said third measurement zone.

52. A communication path quality estimation method according to claim 50, characterized by notifying said base station from said mobile station of all of said first communication path quality measured in a first measurement zone being said data receiving state, said second communication path quality measured in a second measurement zone being said data waiting state, and a

communication path quality measured in a third measurement zone being either one of said data receiving state and said data waiting state.

5 53. A communication path quality estimation method according to claim 50, characterized by notifying said base station from said mobile station of a difference between said first communication path quality measured in a first measurement zone being said data receiving state and said second communication path quality measured in a second measurement zone being said data waiting state, and a communication path quality measured in a third measurement zone being either one of said data receiving state and said data waiting state.

10 54. A communication path quality estimation method according to claim 49, characterized in that said base station uses both said first communication path quality and said second communication path quality for the transmission control of said data.

15 55. A communication path quality estimation method according to claim 54, characterized in that said base station performs the transmission control of said data by using said first communication path quality measured in a first measurement zone being said data receiving state, said second communication path quality measured in a second measurement zone being said data waiting state, a communication path quality measured in a third measurement zone being either one of said data receiving state and said data waiting state, and information indicative of a state of said third measurement zone.

20 56. A communication path quality estimation method according to any of claims 49 to 55, characterized in that said mobile station obtains the communication path quality by using a reception signal quality of said data.

25 57. A communication path quality estimation method according to any of claims 49 to 55, characterized in that said base station transmits a pilot

signal, and said mobile station obtains the communication path quality by using said pilot signal.

5 58. A communication path quality estimation method according to any of claims 49 to 55, characterized in that said base station transmits said data by using an adaptive antenna.

59. A communication path quality estimation method according to any of claims 21 to 55, characterized in that said communication path quality is used for selecting a communication mode.

10 60. A communication path quality estimation method according to any of claims 21 to 55, characterized in that said communication path quality is used for scheduling.